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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/762,779	07/03/2001	Johannes Gijsbertus Antonius Terlingen	702-010166	7918

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EXAMINER

COUNTS, GARY W

ART UNIT PAPER NUMBER

1641

DATE MAILED: 08/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/762,779	Applicant(s) TERLINGEN ET AL.	
	Examiner Gary W. Counts	Art Unit 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07/09/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25 and 28-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25 and 28-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of the claims

The Request for Continued Examination filed July 9, 2004 is acknowledged and has been entered.

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 32 recites wherein the substrate consists essentially of gold. The only disclosures provided in the specification are directed to gold coated substrates (see examples). The specification does not disclose the substrate consists essentially of gold.

Claim 41 recites preselecting a free electron metal substrate, which metal substrate is suitable for allowing investigation by surface plasmon resonance spectroscopy, arranging a pre-selected first functional group species on the free electron metal substrate by means of plasma deposition, which first functional group species protects the free electron metal substrate from a second functional group species whose interaction with the plasma deposited first functional group species can be investigated, thereby preventing undesirable interactions between the free electron metal substrate and the second functional group species, and which first functional group species provides a desired functionality for the second functional group species; and subsequently arranging a second functional group species on the plasma deposited

layer of the first functional group species, where after interaction between the first and second functional group species layers can be investigated by means of surface plasmon resonance spectroscopy. These limitations are not disclosed in the specification.

Claim 42 recites preselecting a free electron metal substrate, which metal substrate is suitable for investigating and sensing surface interactions by surface plasmon resonance spectroscopy, arranging a pre-selected first functional group species on the free electron metal substrate by means of plasma deposition, which first functional group species protects the free electron metal substrate from a second functional group species whose interaction with the plasma deposited first functional group species can be investigated, thereby preventing undesirable interactions between the free electron metal substrate and the second functional group species, and which first functional group species provides a desired functionality for the second functional group species. These limitations are not disclosed in the specification.

Claim 43 recites wherein before being exposed to the second functional group species, a bio/chemical functional layer is wet chemically arranged on the plasma deposited first functional group species and for the prevention of non specific interactions with the said second functional group species. These limitations are not disclosed in the specification.

Claim Objections

2. Claims 34, 47 and 48 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 25 already requires plasma layer directly deposited on a metal film and also requires the film to consist essentially of gold.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 28, 35, 41 and 44-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 28 is vague and indefinite because claim 28 contradicts claim 25. Claim 25 requires the film of free electron metal is comprised essentially of gold. However, Claim 28 recites the electron free metal is selected from the group consisting of copper, silver, and aluminum.

Claim 35 the phrase "preferably" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 41, line 11 the recitation "desired functionality" is vague and indefinite. It is unclear what desired functionality applicant is referring to. Further, there is no definition provided for the term in the specification.

Claim 44 the recitation "the species" is vague and indefinite. It is unclear what species applicant is referring to.

Claim 44 is vague and indefinite because it is unclear what steps applicant is referring to for analyzing the interaction between the species. The claim does not set forth the steps involved in performing the analyzing. For example, there are no steps of contacting interactive species, binding of species or detection of the interaction.

Claim 45 is vague and indefinite because the preamble of the claim is directed toward a method. However, no method steps have been provided for performing the process. For example, there are no steps of contacting interactive species, binding of species or detection of the interaction.

Claim 46 is vague and indefinite because the preamble of the claim is directed toward a method. However, no method steps have been provided for performing the process. For example, there are no steps of contacting interactive species, binding of species or detection of the interaction.

Claim 46 the recitation "a pre-selected, plasma deposited layer arranged on the free electron metal substrate" is vague and indefinite. It is unclear if applicant is referring to the sulfur plasma or something else. Please clarify.

Claim 46 the recitation " a free electron metal substrate" is vague and indefinite. It is unclear if applicant is referring to the substrate of claim 25 or the free electron metal film of gold of claim 25. See also deficiency found in claim 47.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 25, 28-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergstrom et al (WO 90/05303).

Bergstrom et al disclose a device comprised of a substrate (p 13, lines 13-21). Bergstrom et al disclose that a film of a free electron metal of gold is applied to the substrate (p. 5, lines 29-38). Bergstrom et al disclose that the gold surfaces are modified by sulfur compounds (p. 6, lines 4-30). Bergstrom et al disclose that the sulfur compounds have a high affinity for the metal (p. 4, lines 26-30) and that the sulfur binds to the gold metal film (p. 6). Bergstrom et al disclose that the sulfur compounds can be coupled to functional groups.

With respect to the deposited plasma and plasma deposited as recited in the instant claims. The claims are directed to a product and the patentability does not depend on its method of production (plasma deposited). Thus it is irrelevant how the device was produced. The teachings of Bergstrom et al disclose the same device as recited in the instant claims therefore, Bergstrom et al anticipates the instantly recited claims.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 25, 28-31, 33, 34 and 37-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al (EP 0104608) in view of Bergstrom et al (WO 90/05303).

Dunn et al disclose a method and apparatus for modifying the surface chemistry of a substrate. Dunn et al teach that the attachment and orientation of biologically active molecules can be controlled by varying the surface chemistry of a metal substrate surface by using plasma modification techniques which yield a range of surface chemistries and properties (page 4, lines 1-9). Dunn et al teach that these modified polymeric surfaces were subjected to solutions of biologically active molecules and

subsequently tested to demonstrate that attachment and orientation of the large molecule is highly dependent on surface chemistry (page 4, lines 10-16). Dunn et al also teach that the surface of the substrate is irreversibly modified by grafting specific chemical functional groups onto the surface with a plasma of suitable material such as sulfur (page 5, lines 1-25). Dunn et al teach that plasmas can be generated by use of DC or AC sources having a frequency of about 1.0W to about 10 kw. Dunn et al also teach the use of radio frequency (r.f.) sources to generate plasmas (page 9, lines 14-30). Dunn et al disclose that r.f. plasmas are generated at a frequency of from about 1.0 to about 300 MHz at a power to initiate breakdown, such as from about 5 to about 1000 watts at pressures ranging from 0.001 to 10 Torr. The articles are subjected to the r.f. plasma for a period of about 0.1 seconds to about 120 minutes and the plasma treatment can be followed by a quench cycle at or near the surface with pressures ranging from 1 Torr to 760 Torr for time periods of 1 second to 4 hours (page 10, lines 6-19).

Dunn et al differ from the instant invention in failing to teach the substrate comprising a film of gold. Dunn et al also differ from the instant invention in failing to teach a bio/chemical functional layer is wet chemically arranged on the plasma deposited first functional group species layer.

Bergstrom et al disclose a substrate comprising a film of a free electron metal of gold. Bergstrom et al disclose that the gold surfaces are modified by sulfur compounds (p. 6, lines 4-30). Bergstrom et al disclose that the sulfur compounds have a high affinity for the metal (p. 4, lines 26-30) and that the sulfur binds to the gold metal film (p.

6). Bergstrom et al disclose that the sulfur compounds can be coupled to functional groups. Bergstrom et al disclose that gold is a preferred metal layer because of corrosion stability considerations (p. 5, lines 29-34). Bergstrom et al disclose applying a hydrogel to the first functional group and discloses that this hydrogel provides specificity for a second functional group species (p. 8-9). Bergstrom discloses that the hydrogel provides for the minimization of undesired interactions (p. 9).

It would have been obvious to one of ordinary skill in the art to incorporate the use of a gold film as taught by Bergstrom et al into the method and apparatus of Dunn et al because Bergstrom et al teaches that gold provides for a more stable metal surface because of corrosion stability considerations.

It would have also been obvious to one of ordinary skill in the art to incorporate a hydrogel as taught by Bergstrom et al into the method and device of Dunn et al because Bergstrom et al teaches that this hydrogel provides for the minimization of undesired interactions.

With respect to the conditions for gas plasma deposition recited in the instant claims, the optimum conditions for discharge power, exposure duration, plasma gas flow, pressure and frequency can be determined by routine experimentation and thus would have been obvious to one of ordinary skill in the art. Further, it has long been settled to be no more than routine experimentation for one of ordinary skill in the art to discover an optimum value of a result effective variable. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum of workable ranges by routine experimentation." Application of Aller, 220 F.2d 454,456, 105 USPQ 233, 235-236 (C.C.P.A. 1955). "No

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invention is involved in discovering optimum ranges of a process by routine experimentation.”

Id. At 458,105 USPQ at 236-237. The “discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art.” Application of Boesch, 617 F.2d 272,276, 205 USPQ 215, 218-219 (C.C.P.A. 1980).

11. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al and Bergstrom et al in view of Tarlov et al (US

See above for the teachings of Dunn et al and Bergstrom et al.

Dunn et al and Bergstrom et al differ from the instant invention in failing to teach the substrate consists essentially of gold.

Tarlov et al disclose a substrate consisting essentially of gold which has bound to its surface sulfur compounds.

It would have been obvious to one of ordinary skill in the art to incorporate a substrate consisting essentially of gold as taught by Tarlov et al for the modified gold substrate of Dunn et al because Dunn et al and Bergstrom et al teach gold coated substrates having sulfur compounds bound on its surface and Tarlov teaches the substrate made of gold in which sulfur compounds are bound to the gold substrate. Therefore, one skilled in the art would have a reasonable expectation of success utilizing a substrate consisting essentially of gold.

12. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al and Bergstrom et al in view of Kolluri et al (US 5,723,219).

See above for teachings of Dunn et al and Bergstrom et al.

Dunn et al and Bergstrom et al differ from the instant invention in failing to disclose that plasma is deposited from a monomer in gas form.

Kolluri et al teaches the use of a gas monomer in plasma polymerization techniques. Kolluri et al teach that the use of these monomers allow for the determination of a desired surface chemistry (col 5, lines 31-39).

It would have been obvious to one of ordinary skill in the art to incorporate the monomer as taught by Kolluri into the method of Dunn et al as modified by Bergstrom et al because Kolluri et al shows that the use of these monomers allow for the determination of a desired surface chemistry.

13. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al and Bergstrom et al in view of Sluka et al (US 5,932,296).

See above for teachings of Dunn et al and Bergstrom et al.

Dunn et al and Bergstrom et al differ from the instant invention in failing to teach the cleaning of the substrate.

Sluka et al teach the step of cleaning the substrate by means of a pulsed argon plasma before the application of the functional groups to the substrate (col 3, lines 21-24). This process would allow for the removal of any possible surface contamination and allow the surface to be specifically furnished with specific binding sites which are capable of binding directly to an analyte or specific binding partner of interest (col 4, lines 13-15).

It would have been obvious to one of ordinary skill in the art to incorporate the cleaning step as taught by Sluka et al into the method of Dunn et al as modified by Bergstrom et al because Sluka et al shows that this allows the surface to be specifically

furnished with specific binding sites which are capable of binding directly to an analyte or specific binding partner of interest.

Response to Arguments

14. Applicant's arguments filed July 9, 2004 with respect to claims 25 and 28-48 and the Affidavit filed July 9, 2004 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. No claims are allowed.

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lennox et al (US 6,165,335) disclose a device comprising substrate comprising a gold film and thiol groups (sulfur compounds) attached to the gold film (col lines 40-52).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary W. Counts whose telephone number is (571) 2720817. The examiner can normally be reached on M-F 8:00 - 4:30.

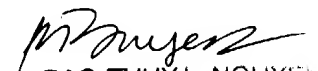
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Gary Counts
Examiner
Art Unit 1641
August 17, 2004



BAO-THUY L. NGUYEN
PRIMARY EXAMINER
8/20/04